



# Year 2002 Progress Report of Activities

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New Mexico Plant Materials Center

1036 Miller Street SW, Los Lunas, NM 87031 Tel: (505) 865-4684, FAX (505) 865-5163, Web Site: [Plant-Materials.nrcs.usda.gov](http://Plant-Materials.nrcs.usda.gov)

## Who We Are

The New Mexico Plant Materials Center (NMPMC) is one of 26 Plant Materials Centers operated by the USDA Natural Resources Conservation Service (NRCS). Areas served by the NMPMC include New Mexico, Northeast Arizona, Southeast Colorado, West Texas, and Southeast Utah. The NMPMC is located twenty-five miles south of Albuquerque in Los Lunas, New Mexico. It is operated in conjunction with the New Mexico State University Agricultural Science Center. The facility is located in the Middle Rio Grande Valley and includes 200+ acres of irrigated land.



Figure 1: New Mexico Plant Materials Center at Los Lunas, NM

## What We Do

It is our mission to develop, test and transfer effective, state-of-the-art plant science technology to meet customer and resource needs. The NMPMC targets these major land resource areas (Ecozones):

- New Mexico and Arizona mountains
- San Juan River Valley plateaus and mesas
- Southern desert basin, plains and mountains
- Southern Rocky Mountains

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- High intermountain valleys
- Pecos-Canadian plains and valleys
- Southern high plains

The NMPMC emphasizes using native plants to solve conservation problems. Environmental conditions including low precipitation, high intensity rainfall, wind, topography, and varied land uses combine to produce a variety of problems needing plant material solutions.

The NMPMC collects superior adapted plants for testing, selecting, and distributing to commercial growers along with seed and plant production technology. Additionally, plant establishment technologies are developed or refined that require minimal or no irrigation in the arid southwest. The following major objectives are addressed:

- Rangeland Erosion Control
- Cropland Erosion Control
- Water Quality Maintenance and Improvement
- Wildlife Habitat Improvement

The articles on the following pages provide a brief summary of Year 2002 accomplishments. For more detailed technical information, request the *Year 2002 Technical Report*.

## High Demand for Native Grasses Bares Cupboards

A recent surge in demand for native grass seed is stressing the supply at the New Mexico Plant Materials Center (NMPMC). The NMPMC propagates native grasses, shrubs, and trees for use in conservation projects throughout New Mexico and the surrounding high desert areas.

The commercial seed industry in the southwest is currently experiencing a boom in demand for native grass seed. This boom is being fueled by the seeding of areas

devastated by recent forest fires, land disturbed by new highway construction and reconstruction, and areas effected by drought.

The breeder stock the NMPMC maintains is that which is most true to type of the original grasses developed by the NMPMC. The breeder stock is used by the NMPMC to establish production fields, also known as foundation seed. The seed from the production fields is sold in turn to commercial enterprises, through the New Mexico Crop Improvement Association, that use it to grow seed they can sell commercially.

As a result of this chain of production, the NMPMC must maintain both breeder and foundation seed for each plant material variety. Maintaining breeder and foundation seed-fields is labor intensive because the fields must be kept nearly weed free.

While the sudden upsurge in demand is good news because it means more conservation and native grasses are being applied to the land, this same demand is stressing the resources of the NMPMC. To respond to this demand, the PMC will be increasing their production in 2003 with the addition of new grass seed production fields.

Demands in the native seed industry ebb and flow. Responding to these fluctuations appropriately is a significant task, and a challenge the LLPMC is ready to meet. The process of getting fields into production takes time, and the patience of commercial producers. Working together, the cupboards can be replenished and the promises of native grasses realized

### **Developing Plant Materials for Riparian Restoration on the Hopi Reservation**

Through an initiative developed by Tom Landis, US Forest Service National Nursery Specialist, the New Mexico Plant Materials Center has begun a collaborative effort with the Hopi Tribe to develop plant materials for the restoration of degraded riparian areas on the Hopi Reservation.

The goal is propagate willow and cottonwood species from cuttings and seed collected from extant populations (see Figure 2) at a number of sites on the Reservation. These propagules will be used to grow stock plants for seed production, tallpot transplants, planting stock for pole production blocks, and other containerized stock as needed for outplanting. The emphasis will be on seed propagation to maximize genetic diversity and to ensure that female and male plants are re-introduced to these riparian areas. Seed will be collected from native stands as well as from stock plants grown at the NMPMC.

During January 2003, US Forest Service personnel conducted an initial collection of cuttings with the assistance of the Hopi Tribal Council's Office of Range Management (see Figure 3). In most cases, male and

female plants were identified in the field by micro-examination of flower buds. These efforts allowed cuttings of both sexes to be collected from several riparian sites on the Reservation. The species included Fremont cottonwood (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), coyote or narrowleaf willow (*Salix exigua*), and an unidentified willow species. The NMPMC will root these reproductive cuttings to force flowering, pollination, and seed production as soon as possible to provide a seed source in case collection of seed from native stands is not possible.

A few remnant plants of narrowleaf cottonwood (*Populus angustifolia*) and quaking aspen (*Populus tremuloides*) can still be found at remote high elevation sites on the Hopi Reservation. Attempts will be made to collect stem cuttings of

narrowleaf cottonwood and root cuttings of aspen in the spring of 2003; these vegetative propagules will be used to preserve this germplasm and allow eventual reintroduction. In addition, the Hopi Tribe has asked the NMPMC to assist in the propagation of several culturally significant plants including desert princesplume (*Stanleya*

*pinnata*), New Mexico Olive (*Forestiera pubescens*), and a wild rose possibly Arizona rose (*Rosa woodsii* var. *ultramontana*).

**Figure 2: Hopi Goodding's Willow**



### **Propagation of Arizona Willow, a Rare and Sensitive Species on the Apache-Sitgreaves National Forest**

The Apache-Sitgreaves National Forest has implemented a recovery program for Arizona willow (*Salix arizonica*), a US Forest Service Sensitive Species and a species listed as highly safeguarded by the Arizona Native Plant Law. A number of management practices have been implemented including installation of grazing exclosures surrounding individuals or groups of plants at 17 sites where the willow has been identified on the Forest. The



Forest has asked the NMPMC to propagate transplants for eventual reintroduction



**Figure 3: Collection of Cuttings, Hopi Riparian Areas**

In April 2002, cuttings were collected from four individual plants from the West Fork of the Little Colorado River and the West Fork of the Black River by Terry Myers (Wildlife, Fish, and Rare Plant Program Manager on the Forest) and Carl-Eric Granfelt (volunteer

expert on willow identification and ecology). These cuttings yielded 73 micro-cuttings (1" to 1.5" long and 0.05" to 0.10" caliper) and the eventual production by the fall of 2002 of 27 plants in one-gallon tree pots with stems up to 2 feet in length. Several plants of each of these clones will be potted during 2003 into large nursery containers to serve as seed and cutting stock plants.

In June 2002, seed from three female Arizona willow plants was collected by Carl-Eric Granfelt from the West Fork of the Little Colorado River and from one introduced plant from the Burro Mountains and sent to the NMPMC for propagation. These seeds were germinated in mini-plug trays (each cell 0.5" x 0.5" x 1.1") and transplanted into 10 cubic inch containers in late July 2002. By the fall of 2002, 420 seedlings had been produced which will be transplanted into one-gallon tree pots in the spring of 2003. If sufficient growth occurs in 2003, the Forest intends to reintroduce these transplants into their native drainages during 2004.

### National Park Service Agreement

The NMPMC has a cooperative agreement with the National Park Service (NPS) to assist the NPS at several of the national parks in the NMPMC's service area. To revegetate disturbed areas in the parks (such as roadsides, trails, campgrounds, and other construction areas), the NMPMC provides the NPS with plant materials (either seed or transplants) of the parks' local, native ecotypes.

This helps to reduce the potential for water and wind erosion. The NMPMC produces both seed and containerized transplants for revegetation purposes.

In 2002, the NMPMC delivered 5195 containerized transplants of 22 different native shrub species to the Grand Canyon National Park.

### Assistance–Conservation Concerns

The NMPMC has worked directly with NRCS Field Offices, Resource Conservation and Development Offices, and Soil and Water Conservation Districts to provide assistance with the following conservation concerns:

- Wind Erosion
- Increased forage on pastureland

Solutions to the concerns have included field wind strips and forage production studies. Providing assistance for these concerns allows the NMPMC opportunities to test new plant materials and to demonstrate new planting techniques.

#### Wind Erosion

The NMPMC continues to provide transplants of Giant Sacaton for demonstration plantings throughout our service area. These trials are evaluating the effectiveness of Giant Sacaton as a species for use in field and farmstead wind strip plantings. In 2002 wind strips were established in Tatum, Deming and Edgewood, New Mexico.

The wind strip provides two important benefits during the critical wind erosion period:

1. Establishes a barrier to protect from wind erosion.
2. Prevents soil particles from moving across the soil surface causing damage to young seedlings.



**Figure 4: Giant Sacaton Transplant**

We are continuing to evaluate the Deming wind strip trials of Giant Sacaton for protection of cropland during the windy season. We are also evaluating the Sacaton wind strip plantings in Tatum and Edgewood for

protection on urban and farmstead sites. The plantings also help us to identify the adaptability of Sacaton (see Figures 4 and 5) to different climate zones in the NMPMC service area.



**Figure 5: Giant Sacaton Wind Strip Transplanting, Turner Farm**

#### ***Forage Production***

The NMPMC has been evaluating varieties of triticale (see Figure 6) as a forage production project that began in 2000 on farmland near Silver City, New Mexico. The project was set up on advice from the NRCS state agronomist to test seed versus forage triticale varieties in New Mexico. Typically seed varieties have been used exclusively in New Mexico.



**Figure 6: Triticale Forage Trial**

Beginning in 2000, a landowner in Silver City agreed to use his irrigated pastureland for triticale trials. Two trials have been completed, and the varieties used to date have not shown any significant difference between the seed and forage types of triticale. New varieties of triticale are being developed, and as they become available, new trials will be established.

## **Riparian Plant Material Distribution and Plantings.**

Every year, the NMPMC offers 100 units of plant materials to each of its supported USDA-NRCS Field Offices. These plant materials are made available for demonstration plantings in order to encourage landowners to restore their riparian areas after they witness first-hand the benefits of these plantings (see Figures 7 and 8).



**Figure 7: Ten-year old pole planting on the Cochiti Pueblo, approximately 30 miles north of Albuquerque.**



**Figure 8: Same site as Figure 7. Debris is damming the stream resulting in step-pools raising the water table and over-bank flooding. These conditions are necessary for natural recruitment of riparian native revegetation.**

In 2002, twenty-three of the 40 New Mexico USDA-NRCS Field Offices requested and received riparian plant materials. These plant materials have a commercial value of about \$18,400.00. Benefits of these plantings include:

- Improved water quality
- Reduced likelihood of downstream flooding
- Improved terrestrial wildlife habitat
- Reduced water temperatures for fish habitat by shading streams and lakes



The Bureau of Land Management (BLM) from the Albuquerque Regional Office is collaborating with the NMPMC to restore the native vegetation along an ephemeral stream in the Malpias Recreation area, about 15 miles south of Grants, NM. In December 2002, the NMPMC provided equipment and an operator for drilling test wells to determine the depth of the water table (see Figure 9). The NMPMC also provided a soil electro-conductivity meter to measure soil salts to further determine the suitability of this area for planting riparian species. This service is available to any USDA-NRCS Field Office or other cooperators involved in large-scale plantings. At a minimum, these measurements should always be performed before considerable resources are spent to restore a site.



**Figure 9: Providing assistance to BLM by drilling test wells at a planting site in the Malpias Recreation area.**

The Bureau of Reclamation (BOR) Albuquerque District Office and the NMPMC collaborated to stabilize the stream banks at the confluence of Las Huertas Creek and the Rio Grande. A 2:1 slope was stabilized using riprap and coir fabric, which was inter-planted with local ecotypes of New Mexico olive (*Forestiera pubescens*) and coyote willow (*Salix exigua*). Two thousand willows were bundled into waddles, which armored approximately 75 feet of stream bank. They were planted at the toe of the bank of the Rio Grande. The mid-bank was planted with the willow placed vertically through riprap using a stinger bar fabricated by the BOR. They used the specifications supplied by the Idaho Plant Materials Center. Thirty-inch tall-pots of New Mexico olive were planted with sub-irrigation tubes at the top of the bank (see Figure 10). Using a rotary hammer drill with a 3-ft. 1-in. diameter bit, the willows were installed vertically on the banks of Las Huertas Creek (see Figure 11).



**Figure 10: Planting willows through riprap at the confluence of the Rio Grande and Las Huertas Creek.**



**Figure 11: Planting 30-inch tall-pots of New Mexico Olive on the edge of the riverbank.**

## Tall-Pots and Hydrogel Increase Shrub Survival

How to increase survival of transplants shrubs with very limited irrigation in the Southwest is the topic of an NMPMC research project currently underway. We are successfully using a combination of tall-pots and super-absorbent hydrogel to achieve a 97 percent survival rate two years after planting. Ensuring shrub survival is particularly important along highway medians and right-of-ways where conventional irrigation is not available.

Other applications include windbreaks, wildlife plantings, and stabilization of critical sites.

The NMPMC is testing this method at three separate locations. A total of 99 shrubs were planted on a highway median in Milan, New Mexico. At the 1-25 and Highway 285 Junction and continuing about 6 miles south, 3,000 shrubs were planted. And, on Highway 599 in Santa Fe, 479 shrubs were planted. At each location, only southwest ecotypes of native species were planted.

Tall-pots containers are being used for these projects. These containers encourage deep rooting of seedlings and have been shown to improve the seedlings' survival and growth rates. The tall-pots used for these projects consisted of 30-inch tall pieces of 4-inch diameter PCV pipe having two spilt seems that run most of the length of the pipe. The split in the pipe encourages the roots to spiral downward. To control root penetration and allow drainage, the bottom of the containers are sealed with a porous fabric coated with copper hydroxide.



**Figure 12: Shrubs established using tall-pots on New Mexico State Highway 124 by the conclusion of the second year.**

The tall-pot transplants are only irrigated once per year, generally with super-hydrogel that absorbs and retains water hundred of times its own weight. To sustain the plants for one full year, super-hydrogel is applied in June (once the spring moisture is near depletion) through irrigation tubes. The irrigation tubes are 3-inches in diameter and are 40-inches in length and hold 1.7 gallons of hydrogel. The lower portion of the tube is perforated which allows for the discharge of the hydrogel near the transplants' root ball. These tubes are placed in the planting holes of each plant before backfilling.

At the three sites, the survival rate has averaged 97 percent. Of the 3,578 tall-pots planted, only 110 plants had died by the end of the second growing season (see Figure 12). These studies suggest that nearly a 100 percent survival rate can be achieved by using tall-pots with irrigation tubes to facilitate deep-root watering.

## PMC Advisory Meeting

On May 30, 2002, the NMPMC hosted its annual Advisory Committee Meeting. This annual event helps the NMPMC to identify high priority concerns of regional landowners and seed growers. Participants included New Mexico NRCS team leaders and state specialists, area native grass seed producers, and other land management specialists from federal and state agencies.

The participants were asked to identify and prioritize needs and issues of concern for the Plant Materials Program to pursue. The issues discussed this year were:

- Prescribed burn plant materials supply
- Catastrophic fire plant materials supply
- Xeriscaping solutions
- High elevation grass and plant species
- High elevation legume species

Also discussed were the New Farm Bill and the types of funding available for projects.

This meeting is an essential part of planning for the NMPMC, and we appreciate the involvement of all interested committee members.

### Committee Members

John D. Allen, USDA-NRCS Southwest Field Team Leader	Tye Curtis, Curtis & Curtis Seed, Inc.
Dr. Richard Becker, Ph. D. USDA-NRCS Riparian Liaison	Larry Christesson, Grass Seed Services, Inc.
Bob Bruce, USDA-NRCS RC & D Coordinator	Walter Henes, Southwest Grass, Inc.
George Chavez, USDA-NRCS Rangeland Management Specialist	Preston Craig, Leroy Hacker, Certified Seed Growers
Ben. W. Creighton, Jr., USDA-NRCS Northeast Field Team Leader	Julie Hall, Army Corp of Engineers
Hollis Fuchs, USDA-NRCS Southeast Field Team Leader	Todd Miller, City of Albuquerque, Open Space Division
Barbara Garrett, USDA-NRCS Public Affairs Specialist	Jessica Sapunar-Jursich, Rio Grande Nature Center
Dan Thomas, USDA-NRCS Central Field Team Leader	Kenneth R. Walker, USDA-NRCS East Field Team Leader
John Tunberg, USDA-NRCS Resource Conservationist	Steve Durkovich, Little Wahoo Ranch
Norman D. Vigil, USDA-NRCS Northwest Field Team Leader	New Mexico Plant Materials Center Staff: Dave Dreesen, Greg Fenchel, Joseph Fraser, Ramona Garner, Danny Goodson